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Flow redistribution and backwater rise due to brush accumulation upstream of logjams with a lower gap

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Engineered logjams with a gap at the bed are used in engineering practice to provide natural flood management and ecological benefits while preserving river connectivity at base flow. In addition, logjams with a gap at the bed form naturally in small streams with river width less than log length. The accumulation of wood pieces acts as a porous obstruction, and the distribution of flow through and beneath a jam with a lower gap satisfies a two-box, momentum-based model constrained by drag generated in the jam, momentum loss in flow through the lower gap, and net pressure force. Accumulation of brush and fine material upstream of logjams occurs naturally as small wood pieces and leaves are transported to the river channel. However, the impact of accumulated upstream material on logjam-generated increase in backwater rise presents a potential concern for long term maintenance of engineered logjam projects. We present recent results demonstrating that initial accumulation of wood pieces upstream of a jam with a lower gap has little impact on backwater rise, but backwater rise increased during a simulated flood cycle as wood pieces blocked the lower gap. The effect of varying brush size and shape and impact on flow redistribution between the jam and gap is examined.